

Properties of Matter: Physical and Chemical

- A Physical Property is a characteristic of a substance.
- Changing the size or amount of the substance does not change the physical properties.

Physical Properties

- Color –red, green, white, etc.
- Texture –smooth, fine, coarse.
- Taste –sour, sweet, salty.
- Odour –what smell does the substance have?
- States of matter at room temperature:
–solid, liquid, gas.

s l g use these symbols in chemical formulas.

- Malleable is the ability of a solid to be hammered or bent into different shapes. Aluminum foil is malleable. Gold is malleable since it can be hammered into thin sheets.
- Hardness –the measure of the resistance of a solid to being scratched or dented
- Luster –How shiny is the substance?

List the Physical Properties

Baking soda is:

- ✓ solid at room temperature
- ✓ white in color
- ✓ crystal form
- ✓ dissolves easily in water.



Chemical Properties

- A chemical property is a behaviour that occurs when a substance changes to a new substance.
- For example:
Is the substance combustible? *burns*
Does the substance have a reaction with acid?
Does the substance react with water? *bubbles*

Physical Changes

- Do not change the organization of subatomic particles of the sample of matter. *atom stay the same.*
- Can be undone quite easily.

Key: No new substance is created.

- Examples: melting ice, freezing water, dissolving salt into water, breaking a stick.

Physical Prop.

Chemical Changes

ratio of atoms change.

1. Change the organization of subatomic particles of the sample of matter.

2. Not easily undone almost impossible

Key: New substance almost always formed.

- Examples: burning wood, baking a cake, digesting food

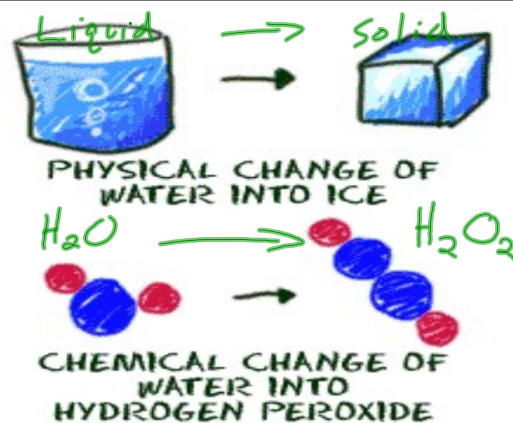
Clues that a chemical change has occurred

1. A new color appears. *test?*
2. Heat or light is given off.
3. Bubbles of gas are formed.
4. A solid material (called a precipitate) forms in a liquid. *$Pb(NO_3)_2 + KI \rightarrow$ precipitate. yellow*
5. The change is difficult to reverse. *yellow*

Chemical Change

- The starting materials are called reactants and the new materials produced are called products.

REACTANTS \rightarrow PRODUCTS



Physical Changes

- Here are some examples of physical changes:

Melting popsicle

Physical



Broken Twig

Physical

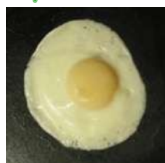


Chemical Change

- Here are some other examples of chemical changes:

Raw egg becomes cooked egg

Chemical



Cake mix becomes cake

chemical



Steel becomes rust

Chemical



Your Turn



Chemical or Physical Changes

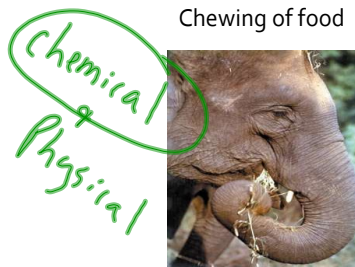
Chemical or Physical ?

Cutting a piece of wood.



Chemical or Physical ?

Chewing of food



Chemical or Physical ?

Rusting Nail



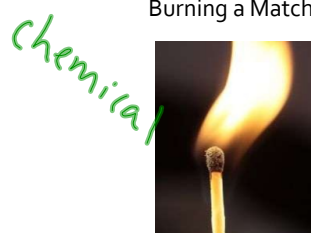
Chemical or Physical ?

Ice Melting



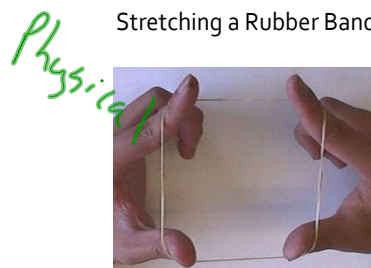
Chemical or Physical ?

Burning a Match



Chemical or Physical ?

Stretching a Rubber Band



Chemical or Physical ?

Breaking a Stick



Physical

Chemical or Physical ?

Tarnishing Silver



Chemical

Chemical or Physical ?

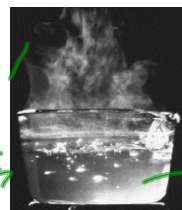
Ripening Tomatoes



Chemical

Chemical or Physical ?

Water Boiling

Physical
change in
state.gas
vapour
↑
liquid

Chemical Tests

Used to identify unknown substances.

Examples:

1. Oxygen gas is indicated if glowing splint bursts into flame

2. Carbon Dioxide is present if limewater solution turns milky. (white precipitate)

also $Pb(NO_3)_2 + KI \rightarrow \text{precipitate}$

Chemical Tests

Examples:

3. Hydrogen gas is present if flaming splint makes a "pop."

4. Water vapor is present if cobalt chloride paper changes from blue to pink

test paper